



Atmospheric origin and ocean modelling of the 7 May 2007 western Black Sea shelf meteotsunami

Ivica Vilibić (1), Jadranka Šepić (1), Boyko Rangelov (2), Natasa Strelec Mahović (3), and Stefano Tinti (4)

(1) Institute of Oceanography and Fisheries, Šetalište I. Meštrovića 63, 21000 Split, Croatia (vilibic@izor.hr, 00385 21 358688), (2) Geophysical Institute, Bulgarian Academy of Sciences, Acad. G. Bonchev Street, bld. 3 Sofia 1113, Bulgaria, (3) Meteorological and Hydrological Service, Gric 3, 10000 Zagreb, Croatia, (4) Dipartimento di Fisica, Università di Bologna, Viale Carlo Berti Pichat 8, Bologna, Italy

We examined a possibility that tsunami event recorded in the western Black Sea on 7 May 2007 was triggered by a traveling atmospheric disturbance. Maximum tsunami wave heights of 3 m were observed in a number of places, although no earthquake occurred in the region at that day. Therefore, two options for the source remained: (i) submarine landslide at the Black Sea slope (Rangelov et al., *Geophysical Research Letters*, 2008, showed that such a process is capable to produce the observed waves), or (ii) atmospheric high-frequency processes. As meteotsunamis are favoring specific synoptic conditions, we inspected available ground and sounding observations, ECMWF re-analysis fields and satellite-based products and compared them to the documented Mediterranean meteotsunamis. We found the atmospheric disturbance traveling towards NNE with amplitude of 2-3 hPa and propagation speed of about 16 m/s, passing through few tens of kilometers wide pathway over the region affected by the tsunami. This disturbance occurred in the lower troposphere, but it was capped by instable convective cell that preserved gravity disturbance's coherence over a region at least 150 km long. Ocean modeling study showed that such a disturbance is capable to generate large tsunami waves and strong currents over the shallow regions, following the observations over the region where maximum sea level oscillations have been documented. Therefore, this event has a potential to be classified as a meteotsunami, the first of such kind in the Black Sea.